

## REMARKS

Claims 1-4, 6, 7, 11-16 and 49-53 are pending. With the previous cancellation of claim 2, 5, 8-10 and 17-48, the previous addition of claims 49-53 and 64, and the renumbering of claim 64 as the new claim 54, claims 1, 3, 4, 6, 7, 11-16 and 49-54 are pending.

Claims 4, 7 and 16 have been amended per the suggestions of Examiner Steadman. Claim 54 has been amended for grammatical purpose by replacing “the mutant synthesize more farnesyl diphosphate” with “the mutant synthesizes more farnesyl diphosphate” without any narrowing in scope.

### STATUS OF CLAIMS AND SUPPORT FOR CLAIM CHANGES

1. (Pending) The amendment to claim 1 is supported, for example, by Examples 4 and 5 and Figure 3 of the specification. Five embodiments of the current invention are disclosed as recombinant gene constructs in Example 4 and demonstrated to synthesize farnesyl diphosphate having a shorter chain length than the native gene in Example 5 and Figure 3 of the specification. Col. 12, line 1 through Col. 14, line 16. The deletion of the comma after “amino acid sequence” is editorial and is performed in order to show the claim amendment as relative to claim 1 in the patent as required by MPEP 1453(IV).

2. (Canceled)

3. (Pending) The amendment to claim 3 is editorial and supported by the patent claim 3.

4. (Pending) The amendment to claim 4 is editorial and supported by the patent claim 4. An editorial amendment has been made in this Response, per the suggestion of Examiner Steadman, by replacing “is a homodimer” with “forms a homodimer”.

5. (Canceled)

6. (Pending) The amendment to claim 6 is editorial, supported by the specification at column 6, lines 22-34 and performed as suggested by the Examiner.

7. (Pending) The current amendment is supported by Example 5 and Figure 2. The amendment has been made as suggested by the Examiner to delete the process conditions used to

determine the thermostability. With the deletion of the process conditions, the amended claim would not narrow in scope. In addition, the temperature, i.e., 70° C or 80° C, at which the mutant prenyl diphosphate synthase is more stable than the wild type enzyme has been inserted in this Response as supported by the data of Figure 2.

8-10. (Canceled)

11. (Pending) The amendment to claim 11 is editorial by replacing “an enzyme” with “the mutant prenyl diphosphate synthase”.

12. (Pending) The current amendment to claim 12 is made as suggested by the Examiner. The amended claim 12 more directly recites the claimed RNA by replacing “transcribed from the DNA according to claim 11” with “encoding the mutant prenyl diphosphate synthase according to claim 1”. The current amendment would not narrow the scope of the claim because the RNA transcribed from the DNA encoding the mutant prenyl diphosphate synthase is also the RNA encoding the mutant prenyl diphosphate synthase.

13. (Pending) The amendment to claim 13 is editorial by replacing “a” with “the”.

14. (Pending) The current amendment to claim 14 is made as suggested by the Examiner. Claim 14 is amended to more directly recite the claimed subject matter by replacing “organism” with “cell”. The current amendment would not narrow the scope of the claim because an isolated host organism transformed the mutant vector naturally involves transformation of the isolated host cell.

15. (Pending) The current amendment is editorial by replacing “host” with “isolated host cell”. The amendment is made as requested by the Examiner. In order to culture a host, it naturally involves culturing the isolated host cell. Thus, the current amendment would not narrow the scope of the claim

16. (Pending) The amendment to claim 16 is editorial by replacing “an enzyme” with “the mutant prenyl diphosphate synthase” previously and by deleting the dependency on claim 2 in this Response because claim 2 has been cancelled.

17-48. (Canceled)

49. (Pending) Claim 49, a claim not found in the patent, is amended from claim 49 presented in the Response to Office Action filed June 29, 2007 by replacing “is modified by” with “is modified by only”. Claim 49 presented in the Response filed on June 29, 2007 differs

from claim 49 presented in the Response filed December 22, 2006 in that the claim recitations are recited in active voice instead of passive voice. The recitation “wherein said amino acid sequence modifications consist of threonine modified to phenylalanine at position 78 and histidine modified to alanine at position 81” is replaced with “, wherein the amino acid sequence of SEQ ID NO:1 is modified by replacing threonine with phenylalanine at position 78 and replacing histidine with alanine at position 81”. Support may be found, for example, in the substitution-mutated pBs-SacGGPS plasmid containing SEQ ID NO:9 disclosed in Example 4 and the functional enzyme expressed from the plasmid as disclosed in Example 5 and Figure 3.

50. (Pending) Claim 50, a claim not found in the patent, is amended from claim 50 presented in the Response to Office Action filed June 29, 2007 by replacing “is modified by” with “is modified by only”. Claim 50 presented in the Response filed on June 29, 2007 differs from claim 50 presented in the Response filed December 22, 2006 in that the claim recitations are recited in active voice instead of passive voice. The recitation “wherein said amino acid sequence modifications consist of threonine modified to phenylalanine at position 78 and histidine modified to leucine at position 81” is replaced with “, wherein the amino acid sequence of SEQ ID NO:1 is modified by replacing threonine with phenylalanine at position 78 and replacing histidine with leucine at position 81”. Support may be found, for example, in the substitution-mutated pBs-SacGGPS plasmid containing SEQ ID NO:10 disclosed in Example 4 and the functional enzyme expressed from the plasmid as disclosed in Example 5 and Figure 3.

51. (Pending) Claim 51, a claim not found in the patent, is amended from claim 51 presented in the Response to Office Action filed June 29, 2007 by replacing “is modified by” with “is modified by only”. Claim 51 presented in the Response filed on June 29, 2007 differs from claim 51 presented in the Response filed December 22, 2006 in that the claim recitations are recited in active voice instead of passive voice. The recitation “wherein said amino acid sequence modifications consist of phenylalanine modified to tyrosine at position 77, threonine modified to phenylalanine at position 78 and histidine modified to leucine at position 81” is replaced with “, wherein the amino acid sequence of SEQ ID NO:1 is modified by replacing phenylalanine with tyrosine at position 77, replacing threonine with phenylalanine at position 78 and replacing histidine with leucine at position 81”. Support may be found, for example, in the

substitution-mutated pBs-SacGGPS plasmid containing SEQ ID NO:11 disclosed in Example 4 and the functional enzyme expressed from the plasmid as disclosed in Example 5 and Figure 3.

52. (Pending) Claim 52, a claim not found in the patent, is amended from claim 52 presented in the Response to Office Action filed June 29, 2007 by replacing “is modified by” with “is modified by only”. Claim 52 presented in the Response filed on June 29, 2007 differs from claim 52 presented in the Response filed December 22, 2006 in that the claim recitations are recited in active voice instead of passive voice. The recitation “wherein said amino acid sequence modifications consist of phenylalanine modified to tyrosine at position 77, threonine modified to phenylalanine at position 78 and histidine modified to alanine at position 81” is replaced with “, wherein the amino acid sequence of SEQ ID NO:1 is modified by replacing phenylalanine with tyrosine at position 77, replacing threonine with phenylalanine at position 78 and replacing histidine with alanine at position 81”. Support may be found for claim 52, for example, in the substitution-mutated pBs-SacGGPS plasmid containing SEQ ID NO:12 disclosed in Example 4 and the functional enzyme expressed from the plasmid as disclosed in Example 5 and Figure 3.

53. (Pending) Claim 53, a claim not found in the patent, is amended from claim 53 presented in the Response to Office Action filed June 29, 2007 by replacing “is modified by” with “is modified by only”. Claim 53 presented in the Response filed on June 29, 2007 differs from claim 53 presented in the Response filed December 22, 2006 in that the claim recitations are recited in active voice instead of passive voice. The recitation “wherein said amino acid sequence modifications consist of phenylalanine modified to tyrosine at position 77, threonine modified to serine at position 78, valine modified to isoleucine at position 80, isoleucine modified to leucine at position 84 and proline and serine inserted sequentially between position 84 and position 85” is replaced with “, wherein the amino acid sequence of SEQ ID NO:1 is modified by replacing phenylalanine with tyrosine at position 77, replacing threonine with serine at position 78, replacing valine with isoleucine at position 80, replacing isoleucine with leucine at position 84 and inserting proline and serine sequentially between position 84 and position 85”. Support may be found for claim 53, for example, in the substitution-mutated pBs-SacGGPS plasmid containing SEQ ID NO:13 disclosed in Example 4 and the functional enzyme expressed from the plasmid as disclosed in Example 5 and Figure 3.

Claim 54. (New) The claim 64 added in the preceding Response to Office Action is renumbered as Claim 54 as suggested by the final Office Action. Descriptive support for claim 54 can be found in Example 5. The wording of the former claim 64 in the new claim 54 per the suggestion of the Examiner to delete the process conditions used to measure the synthesis of farnesyl diphosphate. With the deletion of the process conditions, the amended claim would not narrow in scope.

### **Claim Objections**

Claim 4 was objected to for formality. Claim 4 has been amended in order to improve the form per the suggestion of the Office Action. Withdrawal of the objection is requested.

### **Claim Rejection – Indefiniteness**

Claim 16 was rejected as indefinite for depending on the cancelled claim 2. The dependency on claim 2 has been deleted above. Withdrawal of the rejection is requested.

### **Rejection of Claims —Written Description**

Applicants respectfully traverse the written description rejections of claims 7 and 16. The Office Action states that the “results of Figure 2 indicate that the mutant enzymes have a greater relative activity at 70 or 80 degrees Celsius” (page 5, the last paragraph). Thus, applicants submit that the Examiner would agree that applicants had possession of the invention of claim 7 as amended above at the time the patent application was filed. Thus, the amended claim 7 meets the written description requirement of 35 U.S.C. 112, first paragraph. Similarly, with the deletion of the dependency of claim 16 on claim 2, the amended claim 16 also meets the written description requirement.

Withdrawal of the written description rejections is requested.

**CONCLUSION**

At least in view of the above reasoning, the claims are believed to be in condition for allowance. The Examiner is invited to contact the undersigned to discuss any issues related to this application.

In the event that the filing of this paper is deemed not timely, applicants petition for an appropriate extension of time. The Office is authorized to charge any fees, including the extension fee, or credit any overpayment regarding this application to Kenyon & Kenyon LLP  
**Deposit Account No. 11-0600.**

Respectfully submitted,

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